Fig_1

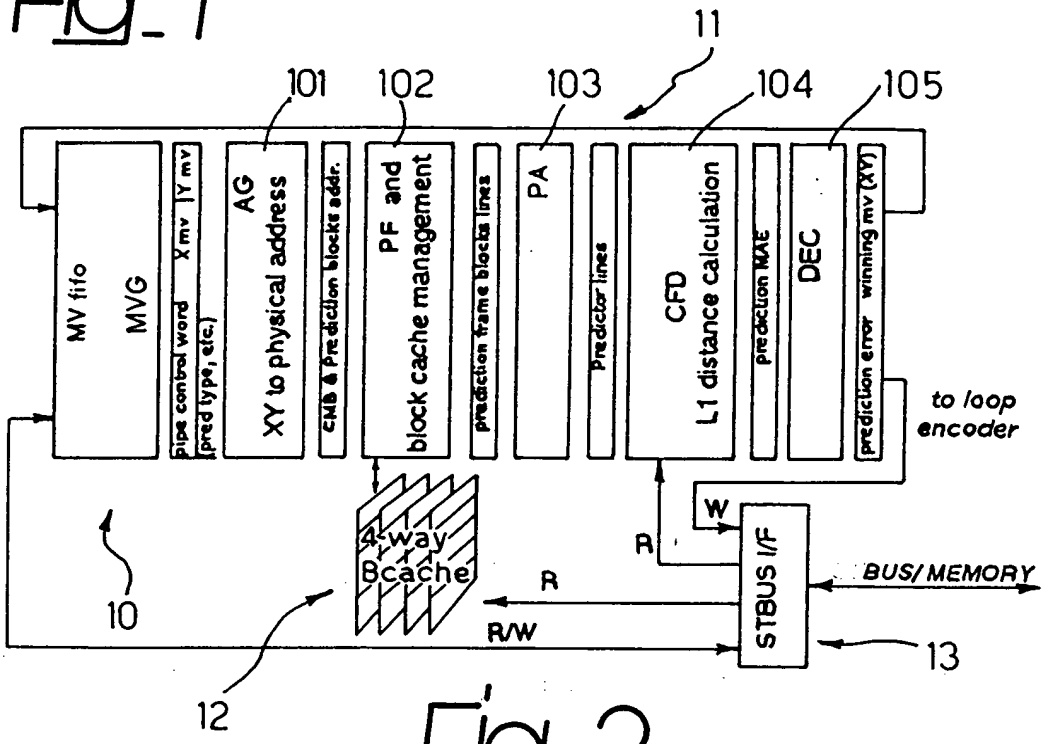


Fig_2

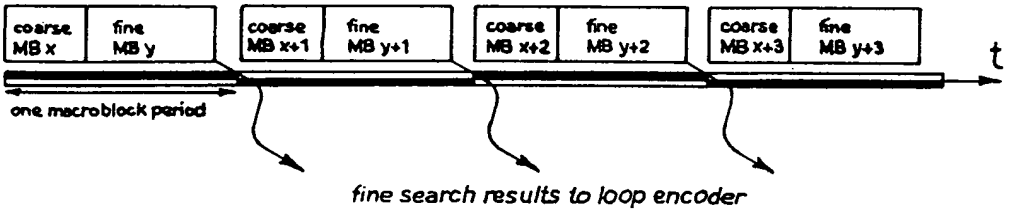


Fig_3

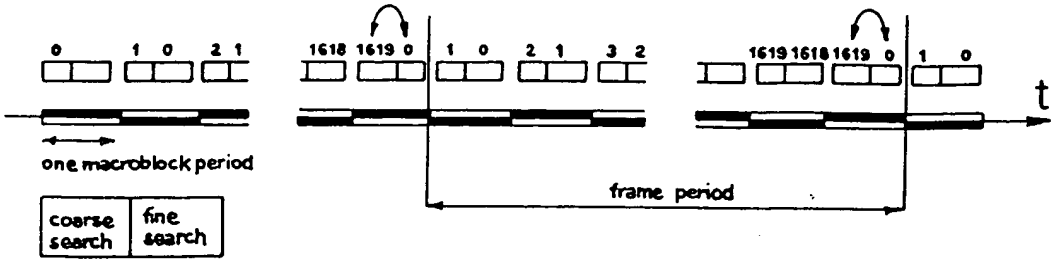


Fig_4

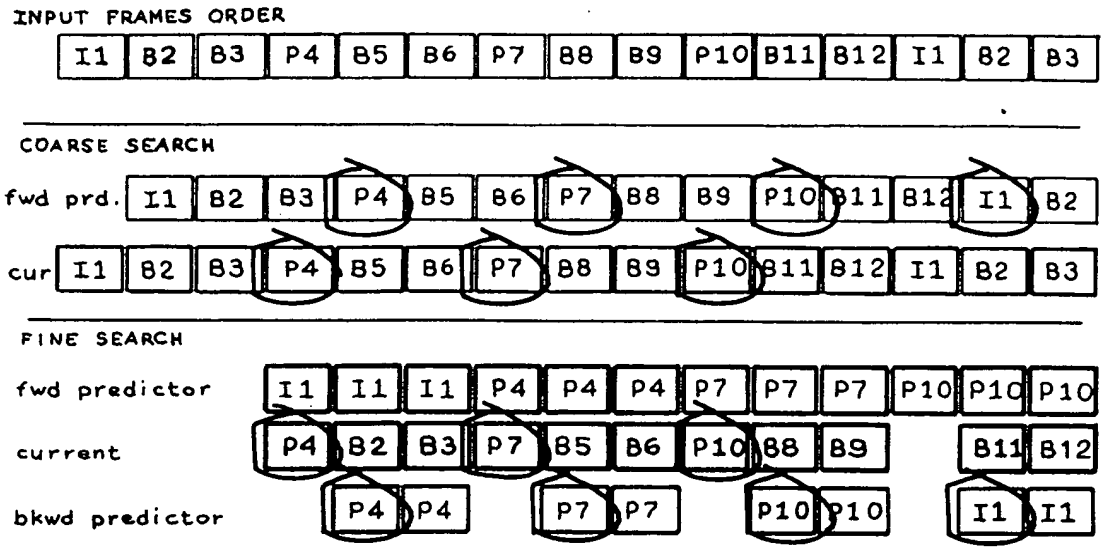

INPUT FRAMES ORDER
I1 B2 B3 P4 B5 B6 P7 B8 B9 P10 B11 B12 I1 B2 B3
COARSE SEARCH
fwd prd.
cur
FINE SEARCH
fwd predictor
current
bkwd predictor

Fig_5

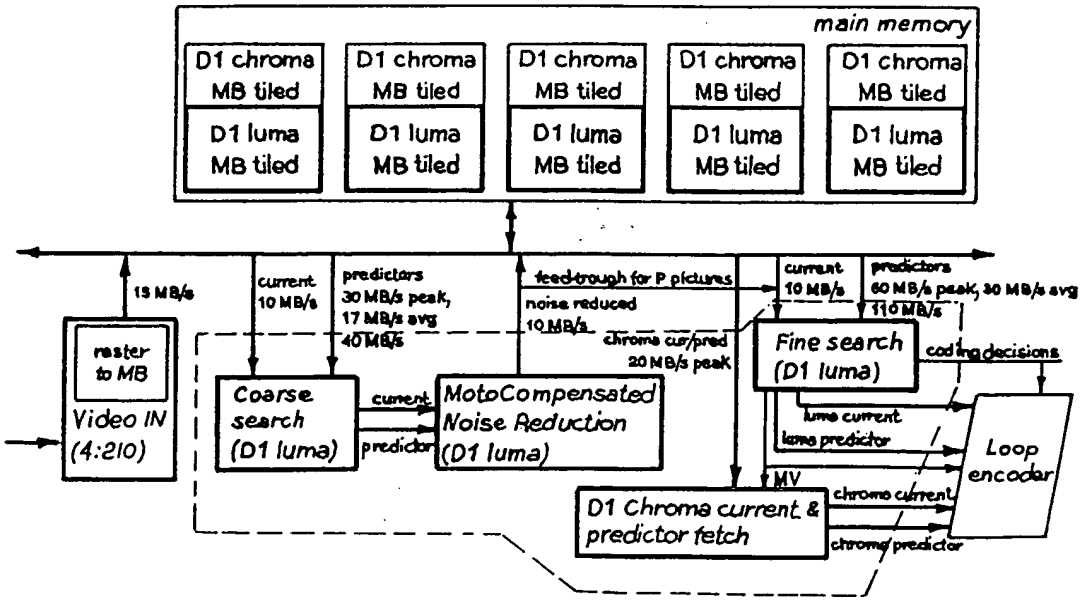

main memory
D1 chroma MB tiled
D1 luma MB tiled
15 MB/s
Video IN (4:210)
raster to MB
current 10 MB/s
predictors 30 MB/s peak, 17 MB/s avg
40 MB/s
Coarse search (D1 luma)
current
predictor
MotoCompensated Noise Reduction (D1 luma)
feed-trough for P pictures
noise reduced 10 MB/s
chroma cur/pred 20 MB/s peak
current 10 MB/s
predictors 60 MB/s peak, 30 MB/s avg
110 MB/s
Fine search (D1 luma)
coding decisions
luma current
luma predictor
MV
Loop encoder
D1 Chroma current & predictor fetch
chroma current
chroma predictor

Fig_6

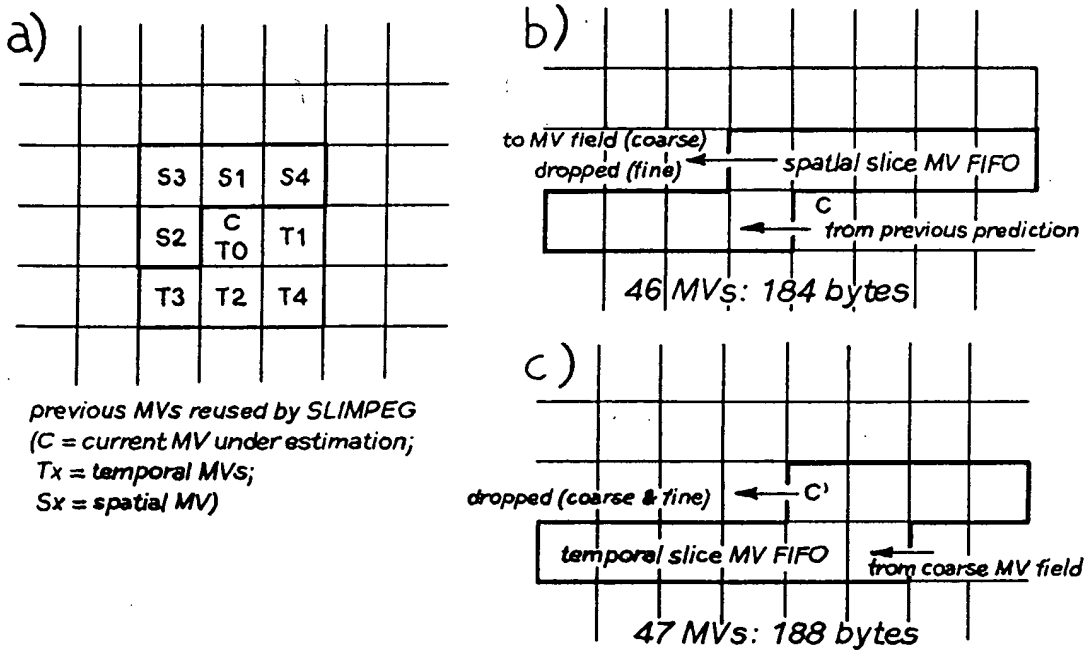

a)
S3
S1
S4
S2
C
T0
T1
T3
T2
T4
previous MVs reused by SLIMPEG
(C = current MV under estimation;
Tx = temporal MVs;
Sx = spatial MV)
b)
to MV field (coarse)
dropped (fine)
spatial slice MV FIFO
C
from previous prediction
46 MVs: 184 bytes
c)
dropped (coarse & fine)
C'
temporal slice MV FIFO
from coarse MV field
47 MVs: 188 bytes

Fig_9

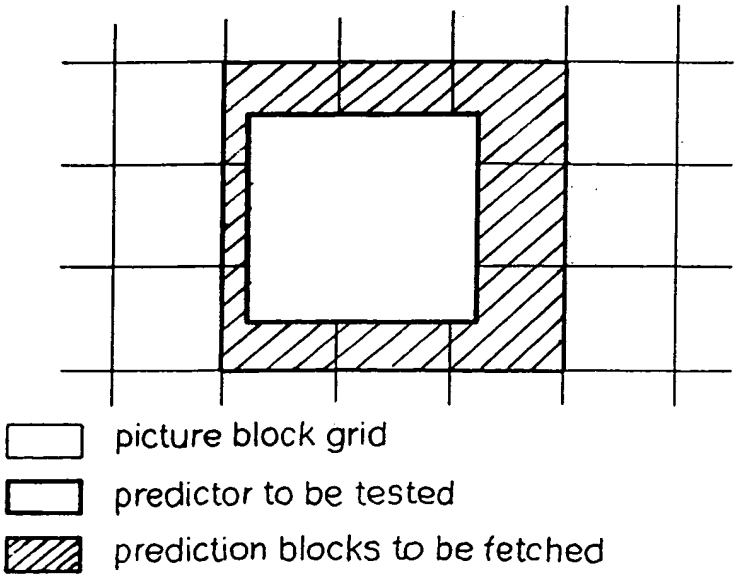

picture block grid
predictor to be tested
prediction blocks to be fetched

Fig_7

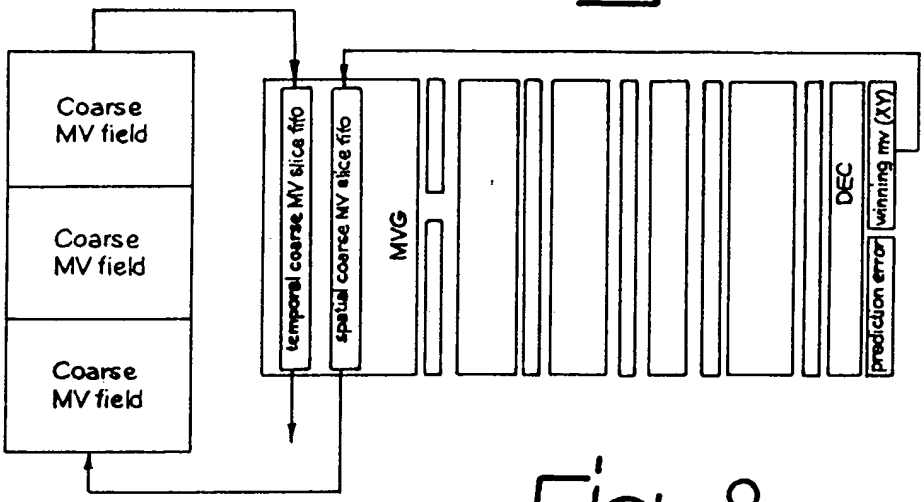


Fig_8

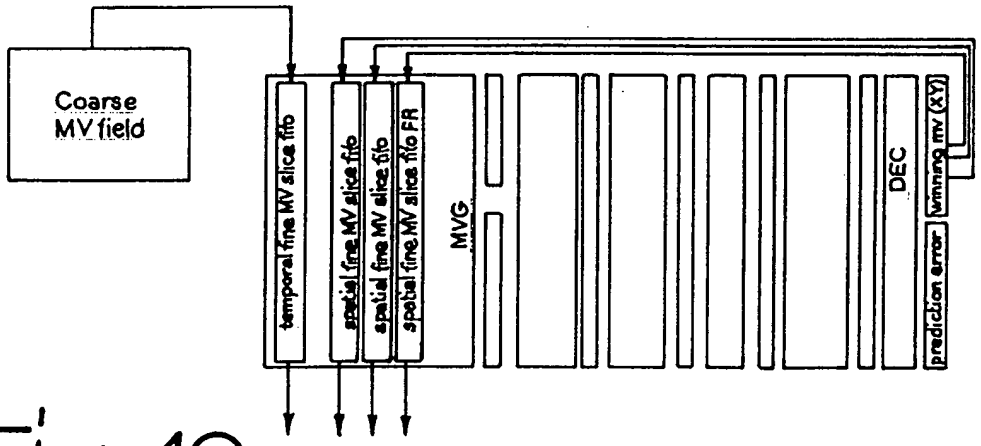


Fig_10

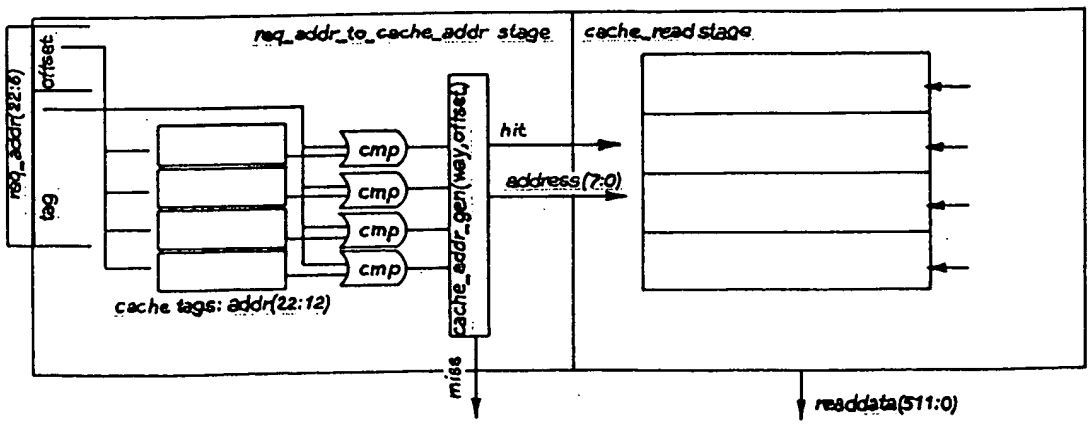
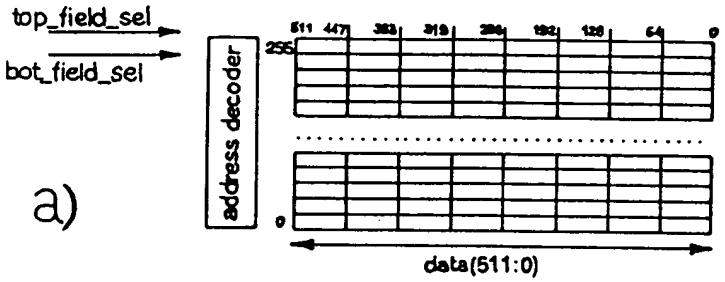


Fig_11


top_field_sel
bot_field_sel
address decoder
511 447 383 319 256 192 128 64 0
255
0
data(511:0)
a)

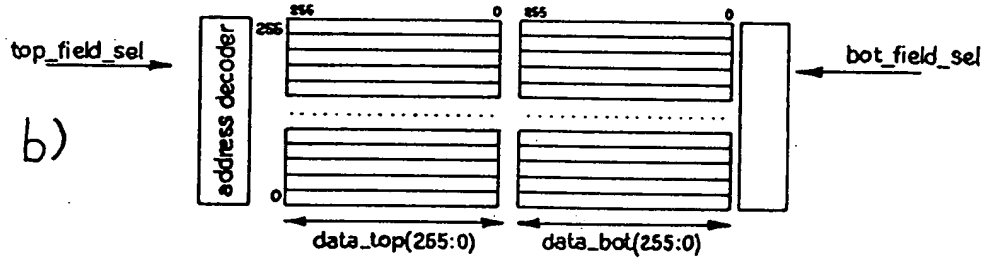

top_field_sel
address decoder
256 0
255
0
255 0
bot_field_sel
data_top(255:0)
data_bot(255:0)
b)

Fig_12

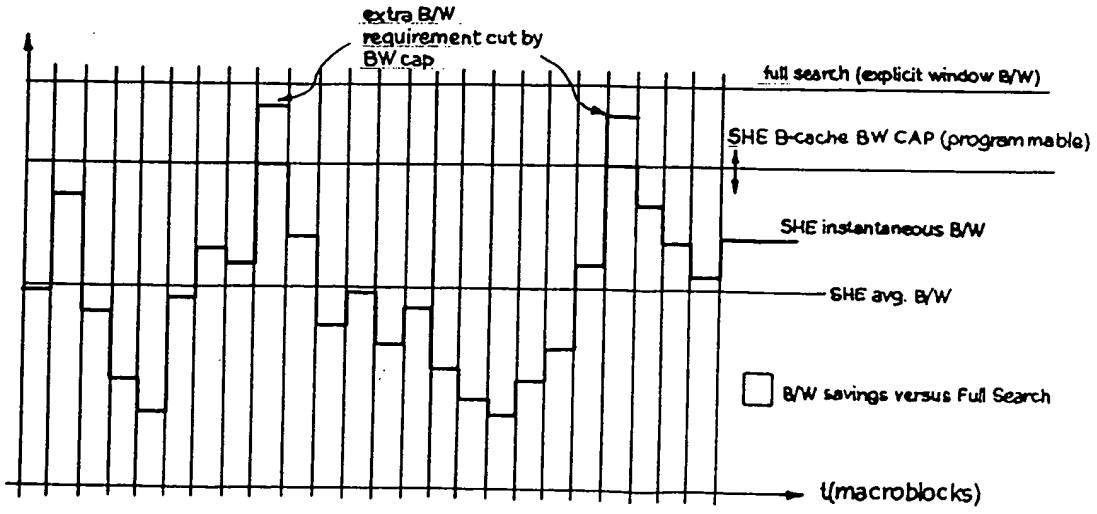

extra B/W requirement cut by BW cap
full search (explicit window B/W)
SHE B-cache BW CAP (programmable)
SHE instantaneous B/W
SHE avg. B/W
B/W savings versus Full Search
t(macroblocks)

Fig_13

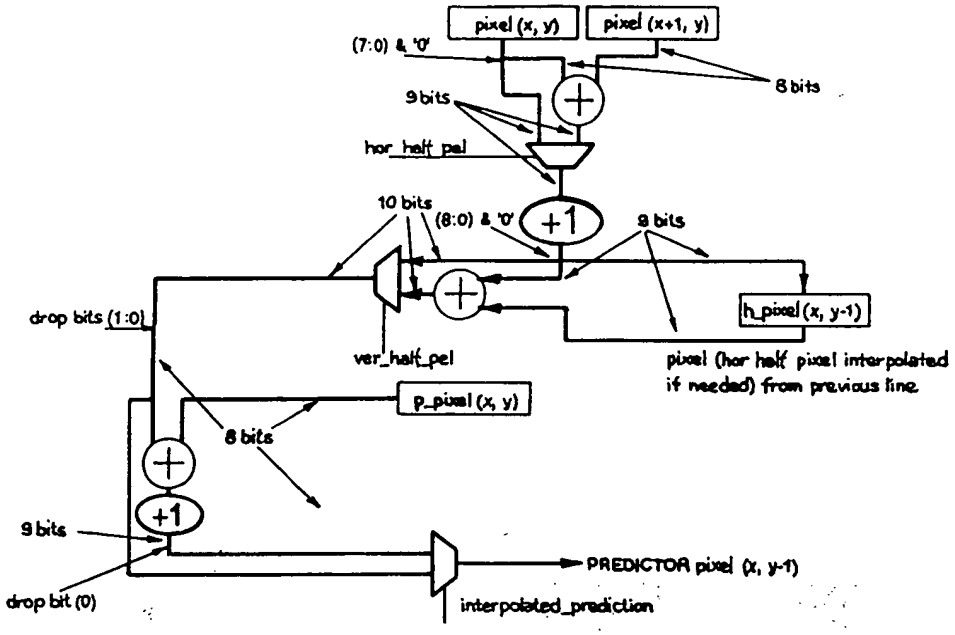

pixel (x, y)
pixel (x+1, y)
(7:0) & '0'
8 bits
9 bits
hor_half_pel
10 bits
(8:0) & '0'
+1
8 bits
h_pixel (x, y-1)
drop bits (1:0)
ver_half_pel
pixel (hor half pixel interpolated if needed) from previous line
p_pixel (x, y)
8 bits
+1
9 bits
drop bit (0)
PREDICTOR pixel (x, y-1)
interpolated_prediction

Fig_14

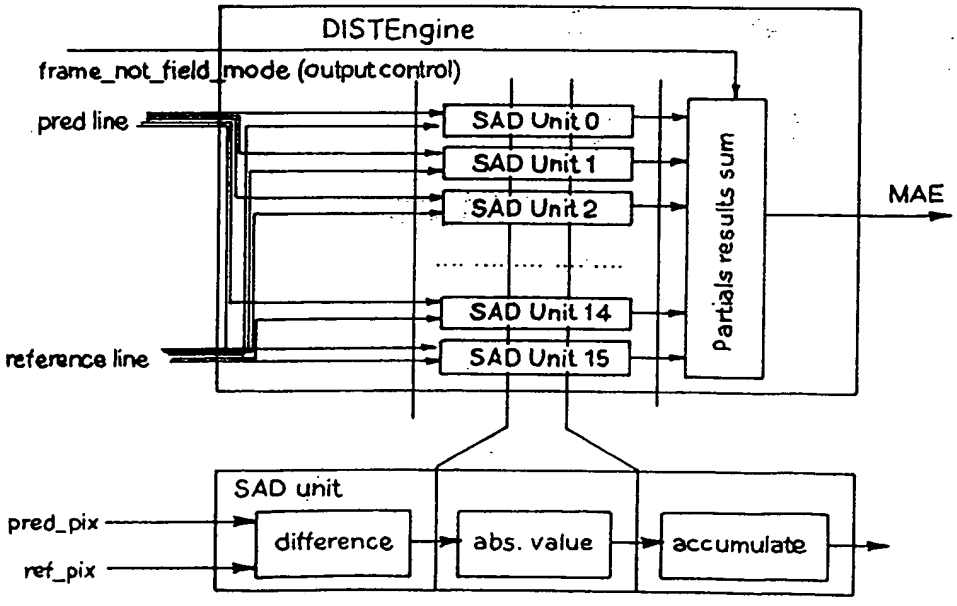
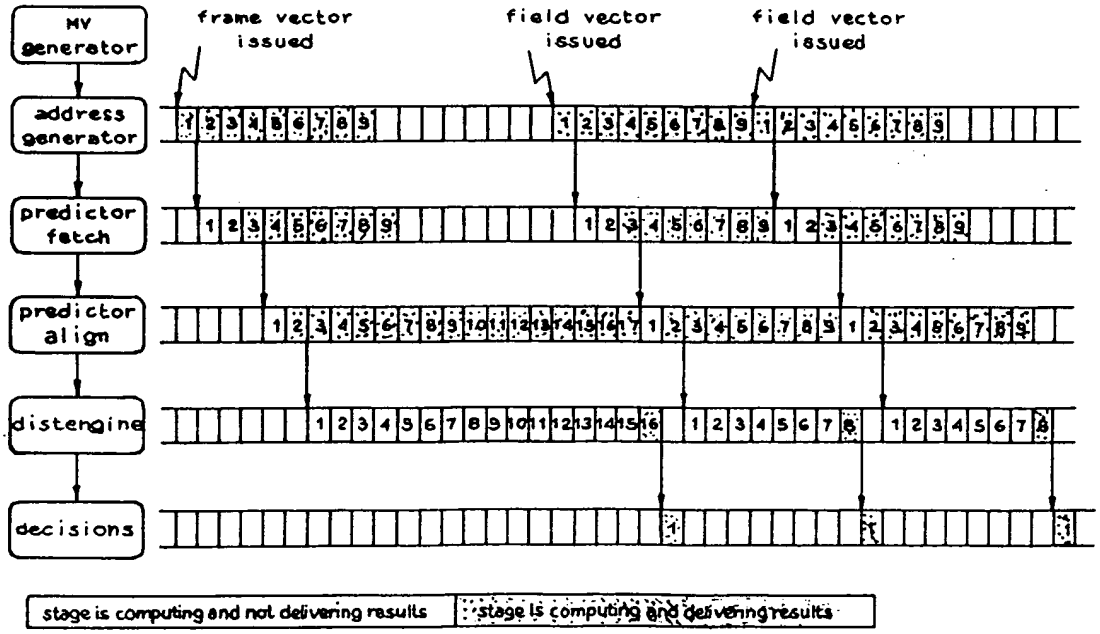

DISTEngine
frame_not_field_mode (output control)
pred line
SAD Unit 0
SAD Unit 1
SAD Unit 2
SAD Unit 14
SAD Unit 15
Partials results sum
MAE
reference line
SAD unit
pred_pix
ref_pix
difference
abs. value
accumulate

Fig_15


MV generator
address generator
predictor fetch
predictor align
distengine
decisions
frame vector issued
field vector issued
field vector issued
stage is computing and not delivering results
stage is computing and delivering results